



OMEGA-3 ENRICHED COMBAT RATION COMPONENTS

The Combat Feeding Directorate recently initiated a project to investigate the possibility of incorporating omega-3 fatty acids, particularly docosahexaenoic acid (DHA) and eicosapentaenoic (EPA), into shelf stable ration items. DHA/EPA may possess potential health benefits for the Warfighter. Specifically, the military is interested in their potential positive effects on inflammation, health, and depression. Initial tests have shown positive results for stability; however, further research is ongoing.

RECOMMENDED LEVELS (GENERAL POPULATION)

The range of suggested DHA + EPA intake per day, as recommended by the ADA, Dieticians of Canada, Int. Soc. for Study of Fatty Acids and Lipids, the UK Scientific Advisory Committee on Nutrition, the Australia and New Zealand Nat'l Health and Medical Research Council, is between 430-610 mg. Additionally, the ADA, Dieticians of Canada, and the World Health Organization recommend two servings of fish per week (for example, salmon has between 1 and 2 grams/3 oz. serving). It should be noted, however, that there is scientific agreement that the ratio of omega-6 fatty acid weight to omega-3 fatty acid weight is an important factor in determining the omega-3 fatty acid level actually needed: i.e., the high omega-6 fat level intake presently in the American diet most likely accentuates the omega-3 fat deficit.

TECHNOLOGY

DHA and EPA are long chain, highly unsaturated fatty acids, with unsaturated bonds starting at the third carbon from the non-polar end of the molecule. This structure renders the fatty acid unstable and susceptible to oxidation. Oxidation results in off odors and flavors, as well as a loss of the DHA/EPA functionality over the long storage periods typically encountered by military rations. Stabilization to mitigate oxidation of these fatty acids is key to the success of a shelf stable ration component. Removal of oxygen from the package during storage is one possible solution for survival of omega-3 products during extended storage. Therefore, ration items packaged under a full vacuum or packaged with oxygen scavengers are the best candidates for evaluating incorporation of omega-3s into rations. In addition, utilization of encapsulation to remove the omega-3s from contact with the rest of the food matrix may also potentially extend shelf life and is being explored. Currently, baked goods, cookies, dessert bars, and retort items appear to be promising candidates for incorporation of omega-3 fats. Storage studies are ongoing; however, it appears likely that individual servings may be enriched with 200-400 mg of DHA/EPA. Our intention is to determine the highest shelf-stable omega-3 fatty acid level in a number of ration components so that an assembly of enhanced products can provide sufficient DHA/EPA intake.

We are planning to conduct a field feeding study, in conjunction with the U.S. Army Research Institute of Environmental Medicine, that focuses on the ability of omega-3 fatty acids in food matrices to mitigate inflammation and associated mood decrements.

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